

Table 6.2. Summary Table: Studies of adolescent populations

	Adolescents (n)	Age (years)	Ethnically Diverse	Longitudinal Study	Cross sectional Study	Assessment Method					Nutrient Biomarkers	Supplement Intake Assessment Method	Outcomes
						Weighed Food Record (no. days)	Estimated Food Record (no. days)	24 Hour Recall (n)	FFQ Type	Other Questionnaire			
National Surveys													
US National Health and Nutrition Examination Survey (NHANES) 1999-2000 (41)	1,165 1,059	12-15 16-19	✓		✓			1; 2 in 10%			✓	Quest & 24HR	Food, nutrient, physical activity, and chemical exposures
Continuing Survey of Food Intake of Individuals (CSFII) 1994-96, 1998 (42)	800 669	12-15 16-19	✓		✓			2			✓	24HR	Food and nutrient exposures, diet and health knowledge
Household Food Consumption and Anthropometric Survey in Poland, 2000 (268)	484	10-15			✓			1				24HR	Energy and nutrient intake
US School Nutrition Dietary Survey, 1995 (216;222)	3,350	6-18	✓		✓			1		✓		NS*	Dietary intake assessed; other questionnaires collected information on school lunch and breakfast; students in grades 1 and 2 interviewed with parents
Austrian Study of Nutritional Status, 1999 (225)	2,173	6-18			✓	7d					✓	NS	Nutrients and food consumption assessed; biomarkers (cholesterol and fat soluble vitamins)
HEUREKA 1991, Switzerland (Sample recruited from visitors to national exhibit) (227;228)	903	7-18			✓			1 self-adm.	FFQ-like 24HR			NS	Self-administered 24HR with food photographs used; FFQ format listing 240 foods; assessed energy intake, 10 food groups, and main nutrient intake.

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National Surveys, continued													
Cross-National Survey on Health Behavior in School Age Children, 20 countries, 1993-94 (226)	33,084	11-15	✓		✓						✓	NS	Soft drink and sweets consumption recorded on 10-item dietary habits questionnaire similar to FFQ.
General Mills Dietary Intake Study, Market Research Corporation of (MRCA) Menu Census Panel Surveys 1980-1992 (229)	1,946	11-18	NS		✓		14d					NS	Four cross-sectional surveys evaluated dietary Ca intake over a 12-year period; serving size information not collected
Dietary Habits in Denmark, 1985-1998 (269;270)	1,000 to 2,000	15-90	NS		✓				10 item		✓	FFQ	National surveys in Denmark since 1985 have examined energy and nutrient intake; initial surveys used in-person FFQ-like interview to recall intake for past 28 days; more recent surveys are telephone-administered short FFQs.
Population Surveys of Food and Nutrient Exposures													
MIT Growth and Development Longitudinal Study, 1990-1997, Massachusetts (271)	178	8-16		✓					Har. FFQ 116-item			NS	Annual Ca intake from food; % kcal from dairy foods; BMI z-score, % body fat from bioelectrical impedance analysis for 4 yr post menarche.

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Population Surveys of Food and Nutrient Exposures, continued													
Amsterdam Growth and Health Longitudinal Study, 1970-2003 (272-274)	200	13-33		✓						✓	✓	DH	Detailed cross-checked diet history (DH) assessed nutrient intake 8 times from age 13 to age 33; body height, body weight, and 4 skin folds and physical activity measured six times; risk factors for coronary heart disease (obesity, hypertension and hypercholesterolemia) and nutrient consumption and physical activity trends over time assessed.
General Mills Dietary Intake Study, Market Research Corporation of (MRCA) Menu Census Panel Surveys 1980-1992 (229)	1,946	11-18	NS		✓		14d					NS	Four cross-sectional surveys evaluated dietary calcium intake over a 12-year period; serving size information not collected

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Population Surveys of Food and Nutrient Exposures, continued													
Child and Adolescent Trial for Cardiovascular Health (CATCH), 2002, California, Texas, Minnesota, California (214;232)	1,874	8-14	✓	✓			1d 3x	3 Mod.			✓	NS	Food record assisted 24HR at baseline (3rd grade) and follow-up at 5th and 8th grade assessed energy and nutrient intake and compared (3rd and 5th grade) energy intake cholesterol, dietary fat, fatty acid intake, and dietary fiber with serum lipids and height and weight.
Child and Adolescent Trial for Cardiovascular Health, US (CATCH) (275)	1,532	14	✓		✓			1				NS	CATCH post intervention tracking study evaluated Healthy Eating Index scores from 24HR of weekday intake.
Project Eating Among Teens (Project EAT), 1998-1999, Minnesota (276;277;277;278)	4,746	11-18	✓		✓				Youth /Adol. Ques. 149-item	✓		NS	Food (fruits, veg. and grains); fast food restaurant use; energy and nutrient (fat, calcium) intake; anthropometric measurements: Time spent in 3 sedentary behaviors assessed (278); Separate Frequency of Fast Food Restaurant Use (FFRU) quest. Administered (277).

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Population Surveys of Food and Nutrient Exposures, continued													
Staffordshire 3-Year Study of Adolescent Nutrition, 2001, Staffordshire, UK (252;279)	105 (51 at 2 yr. follow-up)	13-15		✓	✓		3d					NS	3-d diary and interview using a food photograph atlas assessed energy and nutrient intakes; EI: BMI cut offs applied
Belgian Adolux Study, 2001 (280)	1,526	12-17			✓				57 item			NS	Food and nutrient intake; quantitative information collected on a sub-sample of 234
Changes in Food Habits of Swedish Adolescents Between 15-21 Years, 1993-1999 (281)	208	15-21		✓					29 food grps.			NS	Weight, height, BMI, food group intake, meal patterns measured; FFQ included 30 questions on food habits and amounts eaten and was interviewer-administered
Children's Health Study, 1998-2000, California (247;282;283)	3,280	11-20	✓	✓	✓				Youth /Adol. Ques. 131-item		✓	Youth/ Adol. FFQ	Cross-sectional study of children in 10-yr. longitudinal study of long-term air pollution exposure health effects evaluated lung function and dietary intake of magnesium, potassium, and sodium.

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Population Surveys of Food and Nutrient Exposures, continued													
Young Hearts Project, Northern Ireland (284)	455	12-15		✓							✓	NS	Diet History interview with food photographs administered at 12 years and again at 15 years tracked energy and nutrient intakes.
Growing Up Today Study (GUTS), US, 1996-1999 (236-239)	10,769-16,882	9-14	95% C	✓					Youth /Adol . FFQ 132-item			Youth/ Adol. FFQ	Survey of offspring of participants in Nurses Health Study II examined energy, dietary patterns, physical activity and weight change over 1 yr (236); energy and nutrient intake (237); self-reported height, weight, and Tanner Index (by drawings) 18 questions on physical activity; changes in fruit and vegetable consumption and changes in BMI over a 3-yr period (238;239)
Study of Adolescent Physical Activity, Fitness and Food Habits, 1999, Switzerland (285)	3540	9-19			✓				19 food grps.				19 food groups assessed in this 15-minute self-administered FFQ

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Population Surveys of Food and Nutrient Exposures, continued													
Survey of Population of Mediterranean Spain, 1999 (286)	439	1-20			✓			3				NS	Food and energy intake, energy density
Canadian Study of Folate Indexes in adolescent females, 1998 (287)	229	14-20	✓		✓	3d				✓	✓	NS	Folate intake; RBC folate assay, buccal cell folate; serum homocysteine; serum B12; oral contraceptive use (information from separate lifestyle questionnaire).
Penn State Young Women's Health Study, 1990-1996, central Pennsylvania (261)	80 F	12-18		✓			3d				✓	3dFR	Anthropometric, endocrine, bone measurement; diet and supplement intake measured; FR collected at 6 mo intervals for 4 years and then annually.
Nutrition Education and Teenagers (NEAT) Project, 1996 (288)	791	12-14			✓					✓		NS	NEAT questionnaire contained 31 food intake questions and 62 questions on food behavior, nutrition knowledge, and food and health beliefs and sources of nutrition information.
Minnesota Adolescent Health Survey, 1986-87 (289)	36,284	12-18	✓		✓				10-item	✓		NS	Health behaviors and eating behaviors assessed; FFQ part of larger questionnaire assessing health behaviors.

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Population Surveys of Food and Nutrient Exposures, continued													
Eating Behavior Project-Stanislas Family Study 1994-95, France (247;290)	560-774	10-20 mean age 15			✓		3d				✓	NS	3d FR and French version of Dutch Eating Behavior Questionnaire assessed relationship between dietary intakes, eating behaviors and overweight; each family member completed 3dFR.
Longitudinal Survey of Swedish Adolescents, 1993-94 (291)	411	15		✓		7d			29 item Int. Adm.		✓		Serum ferritin, bone density, bone markers, height, weight, BMI, and dietary intake of energy, nutrients and foods; FFQ interviewer-administered.
The Bogalusa Heart Study, 1992 (260)	1,108	12-17	✓	✓	✓			✓	64-item		✓	NS	Food groups; correlations of food group and risk factors for cardiovascular disease (total serum cholesterol, blood pressure).
Tasmanian High School Survey of Diet, 1985, Australia (247;292)	1,055	12-15			✓		1d						Energy, nutrient and food intake.

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